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THE EVOLUTION OF ECOSYSTEM MANAGEMENT AND THE NEED FOR STRENGTHENING OF FIELD ORGANIZATIONS

A PAPER PREPARED FOR THE BUREAU MANAGEMENT TEAM

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I. ORGANIZATIONAL IMPROVEMENT

THE EVOLUTION OF ECOSYSTEM MANAGEMENT AND THE NEED FOR STRENGTHENING OF FIELD ORGANIZATIONS

The intent of the analysis which follows is to provide a common basis for discussion and understanding of the organizational initiatives which several Bureau of Land Management field offices have underway to improve their performance in order to more effectively manage the people and resources entrusted to them.

The State Directors of Arizona, Oregon, Alaska, California and Idaho have initiated reviews of their organizational efficiency and effectiveness. Other field offices and activities also have organizational initiatives underway or are on the threshold of change. For the sake of brevity, only the four activities noted above will be discussed in this analysis. In reviewing the initiatives, including the movement towards ecosystem management, many common themes and approaches are identified. All of the field offices are actively addressing improvements in efficiency, effectiveness, customer service and accountability. Certainly there are differences, but these differences are natural and necessary – they are accurate reflections of the diversity of location, politics, history, geography, indeed the ecosystems in which each of the organizations operate. Common themes, however, are more frequent than major differences.

In order to have a common understanding of these current change efforts, it is import to understand the genesis and evolution of both ecosystem management and the principles of measuring performance. A brief discussion of these two critical subjects follows. It draws on both the current and historical literature of public organization and natural resources management. A brief summary of the common elements of each of the states' efforts then follows.

This is a dynamic and changing period in the history of public resources management. Consider the following realities:

> Federal agencies that once managed in relative independence and freedom now manage in full view of the public and focused interest and user groups with increasing degrees of accountability. Final actions are regularly questioned, tested and appealed. Interest groups and users are both full partners and, occasionally, adversaries. Budgets are flat to declining. Additional resources are needed nearer to the ground. Administrative and overhead costs are being reduced. Crosscutting managers who communicate well, are effective negotiators and conflict resolvers, and who know both their people and their resources, are needed at every level, especially in the field. Command and control are yielding to participatory management and shared

leadership. Boundaries within the organizations are dissolving. Organizations are becoming flatter. At the same time accountability is increasing. Ecosystem management is rapidly replacing multiple use as a management approach. Interdisciplinary and multidisciplinary approaches are underway. Teams and teaming are viable new approaches for managing and motivating people. And, increased efficiency and effectiveness are the backdrop against which organizations today are being judged.

In summary, the landscape of public resources management is changing. Public resource management organizations have an ethical responsibility to be at the forefront of these changes.

II. ECOSYSTEM MANAGEMENT -A HISTORICAL PERSPECTIVE

The idea of "ecosystem management" is not new. It is a management approach with a solid historical foundation. However, the application of the concept to water and land resources management has renewed interest. Initially this discussion paper will review the evolution of the concept that has taken place since the beginning of the century. Following this historical discussion, the next section will define some of the terms essential to reaching a common understanding of broad concept of ecosystem management.

BACKGROUND

The management of water for human uses extends far back into history. The Roman aqueducts of Italy and Hohokam irrigation works of Arizona are early evidence of managing watersheds. Modern technology to control and store water, however, is of recent origin, and may be measured from the last half of the 19th century when structural designs made possible the storage of large amounts of water in addition to its diversion.

For the United States, the concept of Comprehensive River Basin development was outlined by President Theodore Roosevelt in the first decade of this century as part of the Conservation Movement. Theodore Roosevelt brought this perspective into national political life in his first message to the Congress. Roosevelt stressed his conservation views and in 1903 he appointed a commission to study the remaining Public Lands. In his seven years of office, he added almost 150 million acres to the Forest Reserve. Through Gifford Pinchot, the nation's chief forester, Roosevelt managed to reserve over twenty -five hundred power sites in spite of Congressional opposition by declaring them ranger stations.'

The winter of 1907 produced Roosevelt's philosophical statement of the conservation ethic of wise use determined by economic, social, aesthetic and moral considerations. His goal was "the greatest good for the greatest number for the longest time.", This was the strongest statement to date by a President to the Congress concerning the waste of natural resources. Taking all these into account, Roosevelt created and then charged the Inland Waterways Commission in March 1907 to prepare a comprehensive plan for the coordinated use of the water resources of the country. The Plan would take into consideration "the relations of the streams to the use of all the great permanent natural resources and their conservation for the making and maintenance of prosperous homes."

The Commission report in February of 1908 laid out the modern premise that every river system should be treated as a total unit from its source to its mouth. It also laid the basis for including in any plans established for navigation of inland

waters for interstate commerce, "the consideration of pollution control, floods, power, irrigation, drainage and all other uses and benefits to be derived from their control." The Commission report renewed the Federal role in the federalist system. Local interests, the Commission said, should be considered in relation to regional and national interests. This justified a storage facility high on the Missouri or Monogahela for benefit of flood control on the lower Mississippi. The value of the Inland Waterways Commission lay in its identification of a political, environmental, and natural resource agenda that would be utilized for the next seventy -five years.

In early 1907 the idea of the Governor's Conference surfaced and the date of the Conference was set for May 1908. At the Conference President Roosevelt synthesized into a whole the individual tasks associated with water resources development. To navigation, he added the control of floods; for the West, he considered the problems of irrigation water in its relation to land, forests and settlers' homes. He brought the new knowledge of hydroelectric power into focus as a national resource and a national responsibility. To efforts to stem the raging water -borne epidemics of the period, he added his concern for water pollution and water purification. He gave new life to the nearly outmoded inland waterways by visualizing a network throughout the Mississippi heartland along the coasts and on the Columbia River.

The Governors' Conference of 1908, called by Roosevelt to stimulate thinking of the nations resources, included among its recommendations: (1) that the President call future similar conferences to insure continued cooperation between the states and the Federal government; (2) that state commissions be formed to cooperate with a similar Federal commission to inventory and appraise the condition of the nation's resources, (3) that laws looking to conservation of water resources for irrigation, water supply, power and navigation be enacted.

In practice, such development was slow in coming. For the first twenty -five years of the century, single or dual purpose management schemes prevailed, serving flood control or irrigated agriculture primarily with hydro -electric power added when possible.

The first multiple purpose project was the Boulder Canyon Act of 1928 on the Colorado River (authorizing Boulder/Hoover Dam) serving flood control, irrigated agriculture, hydro -power, water for cities and industry, recreation and fish and wildlife. From that beginning emerged The Tennessee Valley Authority and river basin development programs that encompass nearly all of the Nation's major interstate Streams.

Notwithstanding the reliance on strengthening individual programs within existing agencies like the Bureau of Reclamation, Forest Service, and Public Health Service, the activities of the National Resources Board and the National Resources Planning Board, during the 1930s brought about a resurgence of Theodore

Roosevelt's "comprehensive" approach to resource management.

The work of these agencies focused on broad scale regional plans encompassing all elements of water and resource management and brought together, under Federal leadership, Federal agencies, the regional states, local government, and to a degree, private interests. As a result of these arrangements, following the demise of the Resources Board in the early 1940's, partly as a result of World War II and partly out of Congressional fear of the social views of some of the Board's leaders, the Federal agencies initiated a program of cooperative activity which was carried forward until 1981. The Federal Interagency River Basin Committee (FIARBC) was organized in 1943 to bring together the major Federal agencies in Washington, D.C. By 1945, the Missouri Basin Interagency Committee was established as the first Field Committee related to FIARBC.

By 1946, the Columbia Basin Inter Agency Committee (CBIAC) was formed. These were followed by field committees in the Pacific -Southwest, New England -New York; and the Arkansas -White -Red Basins. In 1954, the Eisenhower Administration revised somewhat the charter of FIARBC and replaced it with the Inter -Agency Committee· on Water Resources (ICWR) while maintaining the several field committees.' In an effort to strengthen the role of the states and enhance cooperative efforts, several studies recommended improving the organizational interdependencies. In 1950, the President's Water Resource Policy Commission' under the Chairmanship of Morris L. Cooke had recommended strongly that River Basin Commissions be established throughout the nation for more effective Federal -State comprehensive planning. This followed closely the concepts outlined by President Theodore Roosevelt.

In 1955 the Hoover Commission proposed the establishment of a Water Resources Board which would create river basin commissions combining Federal, state and private interests., The new Kennedy administration requested legislation authorizing coordinated, comprehensive planning by Federal and state agencies. This legislation raised five principal issues which were: (1) the relative strength of the Federal and state governments in the river basin commissions; (2) procedures used in decision making; (3) overlap of institutions; (4) procedures for creating basin commissions; and (5) question of funds to assist state participation.

At the same time, Congressional dissatisfaction with water development policy resulted in creation of a Senate Select Committee on National Water Resources. This report recommended preparation of comprehensive development plans, funding to assist state participation, a research program, a national assessment, and greater cooperation with the states. By 1965, led by Senator Anderson, the Congress enacted the Water Resources Planning Act of 1965., Under this action, river basin commissions were subsequently established. Clearly, Theodore Roosevelt's ideas were not yet dead. From 1965 until 1981, the Water Resources Council and the several River Basin Commissions carried out limited tasks under the limited powers assigned to them by the Water Resources Planning

Act. But the philosophy of the Reagan Administration was not in keeping with the earlier Republican and Democratic views as expressed over a half -century(Theodore Roosevelt was a Republican), and in 1981 the River Basin Commissions were extinguished by Presidential executive order.

With the rise in concern for the environment and with most of the major large water developments completed, new vales and objectives began to play a major role in the character of water management in the United States. Protection was extended to the idea of Wild and Scenic Rivers, of Endangered Species of animals and plants, of the safeguarding of Biological Diversity, and of protecting the integrity of ecosystems in the recognition of the importance of natural process to man as well as to the non -human biological world.

EXPANDING PLANNING OBJECTIVES

Land and water planning become even more complex due to the application of more sophisticated knowledge about environmental problems and the introduction of planning concerns for esthetics and ecological planning. In 1976 Congress passed the Federal Land Policy Management Act (FLPMA) on the heels of the National Environmental policy Act (NEPA) of 1970. FLPMA and its older sister NEPA required rigorous consideration of all aspects of an ecosystem through the completion of RMPs and EISs.

Environmental pollution is a concern that encompasses the elements of technology, science, law, institutions and customs, and public values. It has increased the complexity of intergovernmental resource planning through a new understanding of the interdependencies between regional and resource issues caused by environmental pollutants such as toxic waste. Indeed, the impact of these concerns makes the earlier demands of the conservation movement as applied to water resources, land and forests appear very reasonable indeed.

In the past 15 to 20 years, the nation has been staggered by the emerging new scientific and technologic information and the interrelationship of economic costs and benefits to regions of the country as well as to their international dimensions. The clearer implications of the health dimensions of the use of agricultural and industrial chemicals, heavy metals and even the use of substances like sugar, alcohol, tobacco and table salt, has had a tremendous impact on society., Added new developments such as the air -borne transport of contaminants such as agricultural pesticides, lead, phosphates, nitrogen and acid -forming materials in precipitation have made immensely more complex the nature of environmental pollution management. And the still more recent emergence of the detrimental effects of disposing of the residues of society in landfill, with substantial negative effects on surface and ground water resources have forced a recalculation of the entire environmental issue.

The newly developing management experiments that attempt to deal with the multifaceted components of environmental pollution as a unit on a regional basis will force the establishment of interdependent and sharing action, and planning in ways not yet encountered in this nation. The concern for water -borne disease, simple hygiene and the protection of fish and wildlife beginning just before the turn of the century culminating in the Water Pollution Control Acts of 1948 up to 1972; the Air Pollution Control Acts of the 1950's and 1960's and 1990's, the Toxic Substances Control Act and Resource Recovery Act of 1976, the Endangered Species Act, and the Comprehensive Environmental Response and Liability Act of 1980 (Superfund).

Because of the interdependencies inherent in intergovernmental planning for environmental pollution, attention of planners has now focused on ecological systems. It is these and related acts which have been geared to essentially separate tasks - -independently managed as they were identified which has categorized great interest in cumulative effects and total ecosystem management. It is the newer - -yet old - -concepts of ecology that are leading the way toward novel management arrangements (unexplored and frightening for the status -quo) that provide the major future challenge for resource managers.

ECOLOGY AND ECOSYSTEM MANAGEMENT

While the term "ecosystem" was first proposed in 1935 by British ecologist A. G. Tansley, the science of ecology formally started in the late 1800s. Odum also noted that "only in the past few years has the word become part of the general vocabulary..." Increasingly, too, the word has been used to mean "the relations among things," and to infer that "everything is connected to everything else."' Thus, ecological planning is beginning, for example, to describe the unified management of the diverse environmental pollutants. It is deeply concerned with man's role in changing the environment and the subsequent effect on living organisms. It recognizes the long evolutionary process during which species diversity has been of immense value to human development and the effect that species eradication may have on future human welfare as well as on other living forms. Interestingly, despite the obvious utility of the concept of the biological community, it is often difficult or impossible to determine where one community ends and the next begins. Many communities do not have discrete boundaries at all , but rather grade continuously into the next. For example, the composition of vegetation at the end points of the continuum is quite different although species may exist along a continuous gradient. As important, the transition zones between communities is quite variable and traditionally more diverse.

Another 20th century concern in planning has been for nonconsumptive resources such as aesthetics, the appreciation of beauty. This concern resembles ecology in that it represents both advances in science and an aspect of changing human values, particularly relating to the preservation and management of scenic,

architectural and other visual resources. Although nationally significant land resources had been set aside earlier (e.g., Yellowstone) more recent concerns are for locally significant aesthetic resources such as historic property and those of outstanding scenic design. Indeed, the Federal National Historic Preservation Act designates concerns of significance to the local, state, and regional, as well as Federal levels. Discussing the state of the nation in water planning and management, One Scholar refers to a "second era" (1930 -1960) of the nation's history in which development played the key role. In a "third era," beginning in 1960, represents less a sharp break with the past than a greater emphasis on nondevelopment factors.'

While some Federal legislation of the 1960's and 1970's relating to natural resources had no provision for Planning coordination; other legislation did. For example, the Wilderness Act of 1964, only required the Secretary of the Interior to give notice to the states and invite them to submit their views regarding his proposals. The FLPMA required consultation with State Governors and various appeal processes. The Wild and Scenic Rivers Act only required that a state's comments be included in the Secretary's report to Congress. On the other hand legislation like the Coastal Zone Management Act(CZMA) and NEPA required substantive state leadership in planning and coordination. In contrast to the Wilderness Act, the CZMA provides for intensive Federal -State involvement in planning. The sections of CZMA providing for assistance in developing land and water use programs and grants for planning state that the Secretary shall consult, cooperate and coordinate with the states and their views must be considered. The extensive provisions for cooperation and planning reflect the fact that coastal states and the Federal government share abutting areas of jurisdiction (the states out from shore to three miles and the Federal government from three miles out to 200 miles) and reflect the fact that what the Federal government does with the resources under its jurisdiction can have a significant impact on the states. In this case state performance standards are developed and are the basis for management decisions.

Lastly, the ecosystem approach has sharpened one of the major arguments of the multiple-use, sustained-yield discussions. Historically, there have been two contesting interpretations of multiple use. The first holds that all uses should be given equal consideration on small areas; the second that multiple use should be applied over larger areas with specific uses given priority on certain parcels. The argument, really over dominant use, has started to move from the first interpretation to the second which favors compartmentalism of the landscape and connotes an ongoing management thrust toward an ecosystem approach

It is evident from these illustrative cases and the growth of cooperative planning that there is no basis for assuming an unchanging role in the intergovernmental arena for natural resource planning in the United States. Change, flexibility and better understanding of relationship are daily maxims for contemporary resource managers. Viewed over the long term, natural resource management statutes reflect attempts to resolve of problems; the changing values of American society, protection of subsistence values, and a growing understanding of

the underlying science of ecology and man's relation to the natural world. These new developments increase the degree of complexity of natural resource and environmental management; force a deeper concern for the need to deal with the interrelationships - -interdependencies; force more of a sharing within and among, and to force the need to look ahead - -to plan - -if the unwanted or unforeseen consequences of man's actions are, to the degree possible, to be avoided.

Concurrent with this wider range of interdependency of objectives and functions, the renewal of interest in the science of ecology was brought into play as timely and ethical public actions reflecting the increasing human concerns abut the environment of the planet.

INTEGRATED RESOURCE MANAGEMENT

The development of integrated resource management is a response to changing needs and priorities. Integrated resource management recognizes that the use of any natural resource inevitably affects the ability to use other resources. Integrated resource management attempts to maximize total benefits to all the citizens from all the Nation's national resources. It reflects an attitude toward shared decision making that must be employed throughout an organization in order to be effective. Integration requires maximum involvement of all interested publics. Also important is the development of an informal process which stresses a cooperative, participative style of management.

Contemporary managers in order to engage in integrated resources management must have the ability and desire to engage in four essential activities: planning, organizing, directing and controlling. Planning attempts to comprehensively focus thinking on a specific problem or problems in order to create a rational solution. Planning includes the formulation of objectives to achieve goals as well as devising and selecting, from among alternatives, certain courses of action. Organizing involves the grouping of activities, establishing of structural relationships and providing necessary coordination. Directing ensures accountability for actions, political will or commitment and the maintenance of communication. Monitoring and evaluation are two forms of control. Controlling evaluates accomplishments against plans and corrects performance and plans accordingly. Within the Federalist context, resource management efforts involve a progressive refinement of decisions.

The ideas of Gallatin, Powell, Roosevelt as well as the court decisions of Justices Marshall and Taney clearly support the idea of levels. The unresolved question is how can the American Federal System legitimize the sharing efforts. Resource management decision -making must occur at three levels. Broad or strategic level decision -making is concerned with setting general objectives. The next, or intermediate, level of decision -making deals with the allocation of lands and the use of resources in greater detail than at the broad level. This level provides

more refined direction for resource management to support accomplishment of broad objectives. Detailed decision -making focuses on the execution of specific management tasks at operational working levels. Detailed, or activity level, decision making ensures that management directives from the broad and intermediate levels are carried out in an efficient and practical manner. Although the different levels of decision -making can be identified in terms of a particular focus, distinctions between the levels are transitional. There is likely to be overlapping of concerns at any point in the decision -making continuum. Most importantly integrated resource planning makes it possible for the government to fulfill its role in management of public resources and assist in developing private resources. And ecosystem management is a means to put into action those plans - in other words ecosystem management is an action - it is not simply a noun but rather an active verb which connotates rigor, comprehensive interrelationships and timeliness.

III. THE VALUE OF MEASURING PERFORMANCE

Federal resource management organizations must respond to the will of the people, accommodate the directives of Congress, respond to executive branch policy, plan comprehensively, maintain options for the future, resolve conflicts with other agencies, consider wide alternatives, adapt to the times, maintain flexibility, and assist states to resolve local problems. And all of this must be measurable - -agencies must be continually accountable with regards to performance to all interests. As with the concept of ecosystem management there is a rich history of performance and evaluation measures and criteria. This brief discussion summarizes several in order to reinforce their essential elements and similar.

The Federal Council on Science and Technology suggest six criteria to measure policy effectiveness and institutional performance:

1. Operating efficiency;
2. Equity in application;
3. Responsiveness to need;
4. Adaptiveness to changing technology;
5. Conduciveness to conservation (in contrast to exploitation in development) of the resources;

The Water Resources Council suggested that seven criteria could be used to evaluate the procedures, organization, and operation of water management institutions. These criteria are:

1. Responsiveness to local units of government;
2. Competency in planning, coordination and research;
3. Allocation of available resources among uses and areas;
4. Control over both water quality and quantity;
5. Ability to decide and to act;
6. Ability to provide financial support;
7. Flexibility to respond to changing situations and to meet future needs.

The Province of Ontario developed eight criteria that a regional unit should possess.

1. Community Criterion - A region should exhibit a sense of community identity based upon sociological characteristics, economics, geography, and history;

2. Balance Criterion - A region should have a balance of interests so that no group can completely dominate the region;

3. Financial Criterion - There must be a financial base adequate to carry out regional programs at a satisfactory level;

4 Functional Criterion - The region should be large enough so that local responsibilities can be performed efficiently by taking advantage of economics of scale;

5. Cooperative Criterion - Regional boundaries should facilitate maximum inter -regional cooperation;

6. Participation Criterion - Regional government proposals should be developed with community participation and when possible community acceptability;

7. Usability Criterion - New regional boundaries should be usable by other institutions;

8. Design Criterion - For cases where there are two tiers of government within a region both tiers should be designed with the same criteria.'

The criteria discussion summarized above includes: Responsiveness to public demands; Flexibility to account for change; Comprehensiveness to address a spectrum of concerns; and Ability to resolve conflicts between and among users.

Since there will probably never be unanimity on what constitutes comprehensive, useful criteria, the overall framework developed herein includes knowledge of primary and secondary requirements, with specific concern for the public interest. This is because evaluators rarely see the direct primary political power confrontations and therefore can only evaluate the secondary requirements or measures of success or failure.

Evaluation criteria might also be developed to identify success and failure. These include:

1. Effort - Assessment of input regardless of output;

2. Performance - results of effort rather than effort itself;

3. Adequacy - degree of performance is adequate to need;

4. Efficiency - evaluation of alternative in terms of cost;

5. Process - how and why a program works.

So, effectiveness may be measured in different ways depending on the evaluation criteria employed. Therefore, evaluation criteria should be developed which will discuss outcomes over a continuum- emphasizing the immediate outputs and moving to the longer term outcomes.

INTERESTED PUBLICS

Criteria are only successful as a measure of effectiveness if they represent the wishes and expressed concerns of interest groups. These interest groups must meet the objectives of participation in and support of the plan process and support of the implementation objective. Therefore, it is important to identify what and who constitute the interested publics.

The interested public is defined in the broadest terms. It includes parties inside and outside the organized bureaucracy and includes public as well as private groups. The interested public forms issue networks which comprise a large number of participants with variable degrees of mutual commitment or of dependence on others in their environment. Participants move in and out of the networks. Network members reinforce each other's sense of issues, rather, than interests defining position in issues.

Another type of evaluation model can be developed using the interested publics and describe as primary and secondary criteria.

The main yardsticks for evaluating such a program are: its clarity; its internal consistency; its compatibility with other policies; its scope in terms of value; its comprehensiveness; and its operationability, in the sense of its being, concrete enough to be a meaningful guide for action.

These yardsticks have two major difficulties. The first is that many policies are not formally stated or crystallized. The second is that ambiguous or narrow policies are helpful in political acceptance. In other words, the

evaluation of real outputs of any public policy is hindered by the wide scope and long time periods which disperse the values. In this investigation the primary output criteria can be identified in a loose way since the objectives of the studies generally must be directed specific outputs. Even so, the measure of the primary output, to be usable, needs other criteria (or secondary criteria) for evaluation. Therefore, the following four criteria: process, outputs, structure and inputs are identified. These criteria have descriptive subparts:

- Process Criteria are defined as those using available information and research.
- Output Criteria are defined as measurable desirability and/or satisfaction.
- Structure Criteria lie in the concept of structure of the conduct and preparation of the study and of the political and social environment which impact the types and amount of sharing.
- Input Criteria provide rather reliable negative conclusions since the lack of these criteria is proof that the model is lacking.
- Organizational development is the building of group or interpersonal effectiveness via teamwork as a way to improve organizational tasks. Team effectiveness theory focuses on several points which include:
- Interdependence - the team is working on problems in which all members have a stake;
- Leadership - improve group performance so that the boss is willing to lead the effort;
- Joint Decisions - all members agree to participate;
- Equal Influence - each person or group has a chance to influence the team building agenda. In other words, team issues deal specifically with the concept of participation

EVALUATION CRITERIA

Based upon the preceding discussion the following general criterion for evaluating performance can be developed. The criteria identified in the forgoing discussions were aggregated into an overall framework and condensed into five main factors.

MAIN CRITERIA	SOURCE CRITERIA
GOAL ACHIEVEMENT	authority to act
	clarity of statement
	action
	value driven
	implementation
	effectiveness
EFFICIENCY	fiscal integrity
	operating efficiency
	plan comprehensiveness
	balance
	quality
	organization effectiveness
	delegation
CONSTITUENCY SATISFACTION	accountability
	consider wide alternatives
	equity
	participation
	interested publics
	take care of customers
	bargaining
	compromise
CONSUMER RESPONSE	responsiveness
	maintain flexibility
	cooperative
	interested publics
	productivity
	flexibility
	adaptability
SYSTEM CONTINUANCE	program significance
	adequate resources
	adaptiveness
	leadership
	sharing of responsibilities
	organizational learning
	political support

In summary, criteria which have great common value are:

1. Goal Achievement - -assume policies are designed to produce measurable and targetable results. This means just what it says it does: to carry out, accomplish, fulfill, produce, complete.

2. Efficiency - -quality of performance in relation to cost. This is closely linked to procedural efficiency in terms of quality of performance.

3. Constituency Satisfaction - -non quantifiable, identifies effectiveness in terms of satisfaction level of external groups and the effort to accommodate and reconcile conflict.

4. Consumer Response - -focus on specific groups who are being revived and emphasize consumer satisfaction as a measure of success.

5. System Continuance - -the key measure is effectiveness in holding together institutions so that the Political system continues to function.

With the above historical perspective on the movement toward a larger ecosystem approach and the background of criteria to assess the directions in which we might want to go, is it an appropriate to ask what BLM'S field offices are doing. The next section is a review of the actions that six offices are presently undertaking to meet the emerging challenges of an ecosystem approach by strengthing the effectiveness and efficiency of the organization.

IV. WHAT SIX OF BLM'S FIELD OFFICES ARE DOING

Drawing on the discussion above and the decades of valuable experience of field officials who are at the forefront of organizational improvement efforts, what the following is a comparison of the common elements of the principal changes underway in Arizona, Oregon, Alaska, California, Idaho and Colorado. They are discussed from the context of activity, process, organizational activity and performance, i.e., Budget, Ecosystem Management, Organization, and Evaluation Criteria.

As noted in the introduction, the State Directors of Arizona, Oregon, Alaska, California, Idaho and Colorado have initiated reviews of their organizational efficiency and effectiveness. Other field offices and activities also have organizational initiatives underway or are on the threshold of change. For the sake of brevity, only the four activities noted above are discussed in this analysis. In reviewing the initiatives, including the movement towards ecosystem management, many common themes and approaches are identified. All of the field offices are actively addressing improvements in efficiency, effectiveness, customer service and accountability. Certainly there are differences, but these differences are natural and often necessary --they are accurate reflections of the diversity of location, politics, history, geography, indeed the ecosystems in which each of the organizations operate. Common themes, however, are more frequent than major differences.

BUDGET

Arizona is implementing a similar system which has some variations. They are allocating a base of funding for each field office plus 30% for operating expanse. A table of organization is established for each field office. When a manager outperforms (underspends) their base budget or 30% operating expense they are able to reallocate it to the priorities of their office as a performance incentive. Arizona also has set up a wide area network and sophisticated FFS based accounting system for their budget which is accessible from each field office. Subactivity accounting is done by the state budget office.

Oregon is adapting its budget process to an ecosystem based approach described in a comprehensive report prepared by its Ecosystem Based Management Organization Team. Oregon too will emphasize budgeting for performance at the ecosystem level in the resource areas. It is important to note that Oregon's budget, including its O&C Lands, is as large as the total of the next two largest state budgets (California and Alaska) in BLM. Oregon also has some ten districts and 33 resource areas.

Alaska has adopted a budget process as a result of the Organizational Effectiveness and Efficiency Review (OEER), which seeks ways to emphasize a

bottom-up budget process building on input from District and other Management Offices. Emphasis is being on internal coordination between the budget process and the land use planning process and, at the same time, this process will be used to clarify roles of AMT/individual DSD's/DM's/Program Leaders. A demonstration of this approach will focus on the Steese/White Mountains District Office.

California has implemented a new budgeting process which allocates workmonths to the field offices and has the state budget office track and oversee each field offices' activity. This process relieves the field offices of the burden of budget management and allows them to focus on delivery of their programs and services. When a vacancy occurs or when a windfall of workmonths becomes available, the State Director has the option to allocate the position or workmonths to that field office or activity which is in greatest need.

Idaho is examining a synthesis of both California's and Arizona's approaches with an emphasis on incentives and accountability. The Idaho effort has benefitted from both of these states' activities. In addition, Idaho is streamlining the annual work plan process and strengthening its state budget office to serve in a stronger support role. Idaho also is examining subactivity accounting by the state budget office with the field offices focusing on program and service delivery focusing on ecosystems.

Colorado is moving in a more classical budget approach by including in the FY 1995 Strategic Budget document a mojor section on Ecosystems, Science, and Management. In this document seven geographical areas are identified for a management based ecosystem approach. Other areas are identifies which need a comprehensive and integrated multi subactivity funding.

ECOSYSTEM APPROACH

Arizona is moving towards an ecosystem approach based on large bioregions and ecosystems within the state such as the Sonoran Desert, Colorado River, Grand Canyon and Colorado Plateau, etc. It is also adapting its resource areas to an interdisciplinary team based ecosystem approach based both on natural systems and partnerships with other entities in those bioregions or ecosystems. Boundaries of districts and resource areas are remaining in tact and the discrete ecosystems are being managed cooperatively with adjacent management units including other agencies, Indian tribes and private owners.

Oregon is shifting its entire management approach to an ecosystem approach with great consideration given to biodiversity. Oregon is in the center of the old growth and spotted owl issue as well as the issue of the potential listing of five salmon species as threatened or endangered. Both of these demanding and challenging issues have influenced Oregon's movement

towards ecosystem management and biodiversity considerations. Oregon's proposal was developed by a team of resource area managers in consultation with other state officials. As with Arizona, resource area boundaries are not being changed, but ecosystems will be managed from existing management units in cooperation with adjacent units.

Alaska is demonstrating an ecosystem approach in the Steese/White Mountains District. This will be accomplished by using an integrated planning, budget and coordination system on a geographic landscape. Because of the general high quality, pristine nature of the lands within the district three specific strategies will be used. These are maintenance of functional ecosystems by managing for continuing biodiversity within the landscape, and the second is to encourage opportunities that are economically and environmentally sustainable. The third strategy is improved coordination. For example, the district has written cooperative agreements with adjacent landowners for sharing of data and data collection responsibilities and ecosystem analysis.

California, with a wide ranging and diverse set of ecosystems and issues from the Mohave Desert on the south, to its vast Central Valley with the largest number of threatened and endangered species in the U.S., to the northwest coast, has entered into a pioneering statewide Biodiversity Agreement which includes virtually every organization interested in ecosystem management in the state. BLM in California is a leader in ecosystem management and a major provider of recreation for the state's population of some 30 million residents-- a population which continues to grow at a rate of 750,000 residents per year. The Bakersfield District also has moved forward with both realignment of resource areas to better fit ecosystem boundaries and with moving more resources personnel to those areas.

Idaho is again drawing on the experience of Arizona, California and Oregon. The Snake River, Salmon-Clearwater, and Upper Columbia River ecosystems, all based on river basins, have initially been identified as ecosystems. All have existing information banks and are identical to the management boundaries established by other resource management agencies. Idaho, too, is wrestling with the anadromous fish issues, with five species of Salmon being considered for listing. Idaho's ecosystems, including wild and scenic rivers, also receive intense recreation pressure.

Colorado has focused on maintaining the existing organization but improving and increasing the multiprogram within improving partnerships and cooperative ventures. This includes multiple agency involvement in managing work on an ecosystem approach.

ORGANIZATION

Each of the six field offices is keeping its organization in tact -- but adapting those existing organizations to new and emerging realities, including ecosystem management. There is a common emphasis of moving resources personnel and programs from the district to the resource area offices. There is also common recognition of the need to manage by ecosystems and to develop a proactive approach to the analysis of and response to potentially threatened and endangered species. Each of the organizations, too, is adopting or evaluating the use of interdisciplinary teams at the resource area level. In the rethinking of the organization to deliver more of an ecosystem approach commonalities such as;

- Several jobs combined into one
- Workers make decisions,
- Work is performed where it makes the most sense,
- Checks and controls are reduced, and
- Field managers provide a single point of contact.

All of the six organizations are piloting and/or prototyping their changes and are learning as they go in order to more effectively adapt. In all cases, flexibility is a byword.

EVALUATION CRITERIA

Against the backdrop of the previously identified evaluation criteria, it is now possible to discuss the effectiveness of these six Statewide initiatives in moving toward an framework of ecosystem management.

1. Goal Achievement -

The six cases are succeeding in meeting to goal of managing on an ecosystem approach. While it appears that a clear model of ecosystem management is still being formulated, the objective of the ecosystem approach is being fulfilled. This is because all the cases are a response not only to changing needs and priorities but a natural evolution of the way in which the bureau as well as the Federal government has been moving for more than 100 years.

With the reassertation of interest by state and local governments, private interests and non-governmental organizations in ecosystem management, the concepts of an ecosystem approach identified in the preceding section become a useful point of departure.

2. Efficiency - -

Organizational modifications as noted above strengthen, not only the deliver of comprehensive environmental services, but improve the organizational strengths. The ability for managers to have the fiscal and

personnel to make decisions in a holistic ecosystem approach can lead to reduced costs and improved decisions and outputs. The opportunity to provide a good balance between guiding growth (economic development) on a sustainable basis and environmental protection will be improved.

3. Constituency Satisfaction

The renewed interest in participation in the ecosystem approach and the opportunities made available by the six states is an important factor is satisfaction. This is because it provides a tool for all parties, both political and interested publics to buy into the planning and management process. This would appear to hold true depending on the size of the ecosystem, the changing constituents and the role of the participants in efforts to accommodate and reconcile conflict.

4. Consumer Response

Consumers, while similar to constituents, are different because they are the receivers of goods and services that the ecosystem approach will provide. in other words, they are the ones most intimately affected by this approach. The manner in which the states have seen fit to delegate resources and power to the lowest but most important element in the states-the resource areas indicates that an ecosystem approach could improve opportunities for on the ground users.-focus on specific groups who are being revived and emphasize consumer satisfaction as a measure of success.

5. System Continuance

If the new systems developed by the states are properly formulated and then evaluated, there will be significant opportunities for the Bureau to development management opportunities. The ecosystem approach needs to be discussed within the historical development of the organizational culture of the Bureau, the political climate and support, and the ever changing way in which our management affects the future.

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SUMMARY

As this paper has indicated, there has been an evolution of ideas from single purpose planning and management to multiple purpose to multiple use to a developing ecosystem approach. Within that change the Bureau of land Management has been able to respond to the needs of the consumers and adaptive enough to respond to technological and political changes. Using two of the basic tenants of ecosystems- structure and function- it is clear that the Bureau is responding to change. Why? For the concern with structure, the six cases have indicated and initiated changes in the in which they were organized. More holistic approaches, improved definitions of size and organizational design such as project teams can be noted. For structure, improvements have been made in the way decisions are arrived at and how responsibilities are allocated.

The entire array of new ideas to meet the ecosystem approach revolve in a philosophy of improving the product and reducing the process demands. Taken over a continuum of time this is no more than expanding the principles of total quality management and this ongoing task of working with the forces of customers and change. The Bureau has met these challenges in the past and this paper suggests that it is meeting then now and preparing to meet them in the future.

DEFINITIONS

Some of the words used in relation to ecosystems are familiar but are used loosely. There are ongoing efforts to develop rigorous, operational definitions acceptable to the scientific community. The brief definitions included here are intended to provide a general common denominator for discussion

ECOLOGY - the scientific study of living things, including humans in relation to each other and to their environment (ecology does not mean environment)

ECOSYSTEMS - An ecosystem may be as narrow as a specific living community in relation to its environment or as broad as living communities, including man and his social system, in relation to their environment. An Ecosystem may be a pond, a lake, a river system or, more generally, a study area defined by the examiner. It contains both biotic and abiotic components through which nutrients are cycled and energy flows. To accomplish these cycles ecosystems must possess a number of STRUCTURAL relationships between soil, water, nutrients, producers, consumers, and decomposers. The FUNCTION of ecosystems is related to the flow of energy and the cycling of materials through the structural components of the ecosystem.

ECOSYSTEM MANAGEMENT - encompass goals for ecological sustainability. These goals include (1) maintenance of essential ecological processes; (2) conservation of biological diversity; and (3) the sustainable use of renewable resources. Ecosystem management is associated with ecological sustainabiity and a general belief that more substantial social change is required to do this.

ENVIRONMENTAL MANAGEMENT - is characterized more by ideas of regulatory and related measures to reduce pollution of water, air and land. Environmental management is more directly associated with environmental protection through modest reform measures.

Other notes on ecosystems are:

(1) The importance of clearly specifying the study area or planning region to which an ecosystem approach is applied.

(2)Dependence of ecosystem integrity on the specifications of scale and function

- Scale must be satisfied by the inclusion of the entire area applicable to the ecosystem under study, whether it be a pond, an embayment, a geological or geographic block of land or a river or lake system.

- Function must be satisfied by the inclusion of all major elements affecting the ecosystem under study including the linkages among the elements.

- Transboundary resource management must add the careful inclusion of human social concerns - the cultural components of human life such as water quality and quantity, water allocation, energy, land use, species and animal populations, public health, geology, etc. and other matters of concern to the human evolutionary.

DOMINANT USE -(From Public land Law Review Commission -text) Although the Multiple Use Acts provide the authority for BLM to consider and permit any and all of a number of possible uses, they provide little guidance as to how the public lands should be allocated. Dominant use of lands recognize that (sic.) congress could provide for a dominant use zoning system identifying the clearly identified use as dominant use and secondary uses would be allowed as compatible. This is not necessary on all lands,

LANDSCAPE -defined as a heterogeneous land area composed of a cluster of interacting ecosystems.

LANDSCAPE DEVELOPMENT - results from three mechanisms operating within a landscape boundary: specific geomorphological processes taking place over a long period of time, colonization patterns of organisms, and local disturbances of individual ecosystems over time.

LANDSCAPE ECOLOGY - focuses on three characteristics of the landscape;
1. Structure - the spatial distribution of materials and species.
2. Function -the interactions among the spatial elements.
3. Change - the alteration of the structure and function overtime.

ECOSYSTEM CONCEPT -which includes structure, function and development may be applied at any level of spatial scale.

BIOLOGICAL DIVERSITY- is defined as the diversity of living things and is usually considered at three levels: genetic, species, and ecosystem.

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APPENDIX 1

CRITERIA FOR INDICATOR SELECTION IN STUDYING THE ENVIRONMENTAL QUALITY OF AN ECOSYSTEM

There are thousands of useful indicators that can be used to study environmental quality of an ecosystem. Since no one indicator can fulfill all purposes and because the potential list is so long some limited, specific criteria need to be chosen. These criteria need to be used to assist in management decision making in a timely and cost effective manner. Characteristics that are desirable in an indicator are listed below.

Biologically relevant	important in maintaining a balanced community
Socially relevant	of obvious value to and observable by shareholders or predictive of a measure that is
Sensitive	to stressors without an all-or-none response or extreme natural variables
Broadly applicable	to many stressors and sites
Diagnostic	of the particular stressor causing the problem
Measurable	capable of being operationally defined and measured, using a standard procedure with documented performance and low measurement error
Interpretable	capable of distinguishing acceptable from unacceptable conditions in a scientific and legally defensible way
Cost-effective	inexpensive to measure, providing the maximum amount of information per unit effort
Integrative	summarizing information from many unmeasured indicators
Historical data is available	to define normative variability, trends and possible acceptable and unacceptable conditions
Anticipatory	capable of providing an indication of degradation before serious harm has occurred, early warning
Nondistructive	of the ecosystem
Continuity	in measurement over time
Appropriate scale	for the management problem being addressed
Nor redundant with other measured indicators	providing unique information
Timely	providing information quickly enough to initiate effective management action before unacceptable damage has occurred

Differences in the way indicators are use can guide the trade-offs necessary in selecting indicators along these gradients. There are five purposes for which data are collected.

Assessing the current condition of the environment in order to judge its adequacy. (i.e. a compliance indicator)

Documenting trends in the condition over time, i.e. degradation or rehabilitation (a compliance indicator or sometimes an early warning indicator)

Anticipating hazardous conditions before adverse impact in order to prevent damage before the fact (i.e. an early warning indicator)

Identifying causative agents in order to specify appropriate management action (i.e. a diagnostic indicator)